BIOMECHANICS AND KINESIOLOGY

BMKI 9000 GRANT WRITING FOR THE BIOMEDICAL SCIENCES (3 credits)
The purpose of this course is to introduce students to the scientific process and translate it to effective grant writing for biomedical sciences. Topics covered include hypotheses development, strong inference, how to write specific aims, how to generate ideas, federal grant processes with emphasis on National Institutes of Health, National Science Foundation and Veterans' Affairs, how to evaluate calls for grant applications, grant construction, and stylistic writing approaches. Students will compare and contrast successful and unsuccessful grant submissions.

BMKI 9001 RESEARCH IN HEALTH & KINESIOLOGY (3 credits)
The course introduces students to scientific writing, quantitative research design, and statistical methods. Considerable emphasis is placed on evaluation of research in scholarly publications. A research proposal in the form of a grant proposal is written as one of the course requirements. Students will develop the skills necessary to analyze study designs in existing literature and create a research proposal. (Cross-listed with HEKI 8030).
Prerequisite(s): Graduate standing. Not open to non-degree graduate students.

BMKI 9010 PRINCIPLES AND PRACTICE OF BIOMEDICAL RESEARCH (3 credits)
The purpose of this course is to introduce students to a variety of topics related to research practice that will allow them to be successful, independent scientists. Topics covered include manuscript writing and plagiarism, authorship, mentoring, research ethics, responsible conduct of research, presentation skills, research notebook keeping, scientific etiquette, and time and laboratory management.

BMKI 9031 BIOSTATISTICS IN BIOMECHANICS I (3 credits)
The focus of the course is to prepare students to understand and apply research and biostatistical methods needed in the design and analysis of biomechanical investigations. The major topics to be covered include research design and multiple linear regression. (Cross-listed with BMCH 8030)
Prerequisite(s): Graduate Standing in Biomechanics program or Department Permission.

BMKI 9040 BIOSTATISTICS IN BIOMECHANICS II (3 credits)
The focus of the course is to prepare graduate students to understand and apply advanced research and biostatistical methods needed in the design and analysis of biomechanical investigations. The major topics to be covered include advanced research design and the general linear model. This course builds upon basic research design and linear regression learned in Biostatistics in Biomechanics I for the application in single factor and multi-factor experimental analyses.
Prerequisite(s): Graduate Standing, BMCH 8030/BMKI 9031 or equivalent

BMKI 9041 ADVANCED STATISTICS (3 credits)
This course will be a study in the statistical methods commonly used in descriptive and experimental research in physical education and exercise science. Application, particularly regarding the purpose, selection, and interpretation of statistical procedures will be emphasized. (Cross-listed with KINS 8040).
Prerequisite(s): HPER 8030/HEKI 8030 or BMKI 9001/HPER 9031/HEKI 9031 or equivalent

BMKI 9050 PHYSICAL ACTIVITY EPIDEMIOLOGY (3 credits)
This course will cover the broad scope of the issues related to epidemiological methods that are relevant to the study of physical activity populations. It is intended to enhance students' ability to understand and apply epidemiological methods to physical activity related research.
Prerequisite(s): PE 8130/KINS 8130 and PE 8040/KINS 8040 or related course, or permission by the instructor. Not open to non-degree graduate students.

BMKI 9101 NONLINEAR ANALYSIS FOR MOVEMENT STUDIES (3 credits)
This course is to introduce different nonlinear methods for the analysis of biological and movement time series. Emphasis will be given on understanding the algorithms behind each nonlinear method. (Cross-listed with BMCH 8100).
Prerequisite(s): Instructor Permission

BMKI 9131 IMPLEMENTING PHYSICAL ACTIVITY IN DIVERSE POPULATIONS (3 credits)
This course will focus on information necessary to assess, design, implement, and evaluate the need for and effectiveness of physical activity interventions in diverse populations, races, and ethnicities. These populations will include: African American, Native American, Hispanic, Asian American, Pacific Islanders, and Caucasian. Additionally, candidates will complete a health and physical activity service learning project in which they will work with diverse populations in the community. (Cross-listed with KINS 8130).
Prerequisite(s): PE 3900/KINS 3900 or PE 8905/KINS 8905 or PE 8700/KINS 8700 or HED 8600/PHHB 8600.

BMKI 9141 PHYSICAL ACTIVITY ASSESSMENT AND HEALTH RELATED RESEARCH (3 credits)
This course will cover the broad scope of research on physical activity and public health. Emphasis will be placed on the application of physical activity assessment techniques. (Cross-listed with KINS 8140).

BMKI 9201 MATLAB FOR MOVEMENT SCIENCES (3 credits)
Introduction to Matlab software, plotting data, spectral analysis and the Fourier transform, data smoothing, and image analysis of movement related data. All topics will be implemented using Matlab. (Cross-listed with BMCH 8200).
Prerequisite(s): Instructor permission.

BMKI 9221 METHODS IN CARDIOVASCULAR BIOMATERIALS RESEARCH (3 credits)
This course contains lecture and lab components focused on cardiovascular biomaterial development and characterization methods used in academia and industry. The lecture component will provide the necessary clinical background of cardiovascular diseases and the theoretical background of cardiovascular biomaterials and state-of-the-art research methods. The lab component will provide practical experience focused on cardiovascular biomaterial design, manufacturing, and characterization methods. (Cross-listed with BMCH 8220).

BMKI 9300 SYSTEMATIC REVIEW AND META-ANALYSIS (3 credits)
This course is designed to introduce students to the process of completing systematic reviews and meta-analyses. The objective of the course is to provide students with a foundation of the requisite skills necessary to perform a quantitative and qualitative synthesis of the literature within their area of interest.
Prerequisite(s): HEKI 8030 or equivalent research methods course.

BMKI 9301 STEM TEACHING METHODS FOR DEVICE DESIGN (3 credits)
STEM Teaching in Biomechanics focuses on principles in teaching including teaching models (Problem-Based, Team-Based, Inquiry-Based teaching), student assessment, classroom logistics/organization, and device design through a mentorship project. (Cross-listed with BMCH 8300, STEM 8300).

BMKI 9401 MOTOR LEARNING I (3 credits)
Discussion and analysis of scientific principles related to the learning of motor skills; review related literature and research in motor learning. The focus of the course is on recent theories of how movements are acquired and performed, and on factors that have implications for motor learning throughout the life span. (Cross-listed with BMCH 8400).
Prerequisite(s): Department Permission.

BMKI 9411 MOTOR CONTROL I (3 credits)
The focus of the course is to explore the study of the conditions and factors that influence the control and performance of motor skills from both neurophysiological and psychobiological perspectives. (Cross-listed with BMCH 8410).
Prerequisite(s): Department Permission. Not open to non-degree graduate students.

BMKI 9421 MOTOR DEVELOPMENT (3 credits)
This course focuses on the study of motor development, the processes that underlie this development and the factors that influence it. Students will gain an understanding of the major theoretical perspectives of motor development across the life span with special emphasis given in child development. (Cross-listed with BMCH 8420).
Prerequisite(s): PE 2800 (Motor Behavior) or permission of instructor.

BMKI 9451 ADVANCED BIOMECHANICS (3 credits)
The course will address the biomechanical basis of human performance including mechanical analysis of human gait, fundamental movement patterns and techniques used for collecting biomechanical data. (Cross-listed with BMCH 8450).
Prerequisite(s): BMCH 4630 (Biomechanics) [previously PE 4630] or Instructor Permission.

BMKI 9460 ADVANCED BIOMECHANICS II (3 credits)
A comprehensive and advanced detailed investigation of the biomechanics of motor performance in special populations such as stroke, Parkinson's disease, and amputees. Includes advanced study of the mechanical analysis of motor skills and movement patterns and the research techniques for collecting and interpreting biomechanical data. Detailed lectures will cover etiology of such special populations with a focus on the endpoint movement disorders.
Prerequisite(s): BMCH 8450 or BKMI 9451/BMCH 9451 or Instructor Permission. Not open to non-degree graduate students.

BMKI 9500 MOTOR LEARNING II (3 credits)
The focus of the course is to further explore the study of the conditions and factors that influence the learning and performance of motor skills.
Prerequisite(s): BMCH 8400, BMKI 9401/BMCH 9401 or Instructor Permission. Not open to non-degree graduate students.

BMKI 9510 MOTOR CONTROL II (3 credits)
The focus of the course is to further explore the study of the conditions and factors that influence the control and performance of motor skills.
Prerequisite(s): BMCH 8410, BMKI 9411/BMCH 9411 or Department Permission. Not open to non-degree graduate students.

BMKI 9520 MOTOR DEVELOPMENT II (3 credits)
This course focuses on the study of motor development, the processes that underlie this development and the factors that influence it. This course will focus on exploring motor development in clinical populations of people with autism, down syndrome, cerebral palsy, etc. and the factors that influence the progression of motor skills.
Prerequisite(s): BMCH 8420 or permission from instructor.

BMKI 9691 MATHEMATICS OF BIOMECHANICAL DATA PROCESSING (3 credits)
Biomechanics is a rapidly changing and technologically dependent field of study. A thorough understanding of the factors influencing outcome measures is critical to correctly interpreting results. Students will be exposed to various data acquisition systems, approaches, and choices required to assess the computational aspects of biomechanical data critically. This course will equip students to complete independent processing from raw data to 3D joint angles and forces. (Cross-listed with BMCH 8690).
Prerequisite(s): Departmental Permission

BMKI 9701 PSYCHOLOGY OF PHYSICAL ACTIVITY (3 credits)
The central purpose of this course is to examine the psychological antecedents and consequences of exercise and physical activity behaviors. The course will focus on traditional theories/principles of psychology as they relate to various physical activity settings. (Cross-listed with KINS 8700).

BMKI 9810 HIGHER EDUCATION TEACHING SEMINAR (3 credits)
The seminar is designed to prepare students for entry into a higher education teaching career. This seminar requires doctoral students to teach an undergraduate or graduate lecture course relevant to their field of preparation. The seminar includes an examination of the roles, responsibilities, and privileges associated with teaching in higher education.
Prerequisite(s): Admittance to the UNO Doctoral Program in Biomechanics and Kinesiology and successful completion of 24 hours of doctoral coursework and approval from advisor. Not open to non-degree graduate students.

BMKI 9820 SERVICE EXPERIENCE IN HIGHER EDUCATION (3 credits)
This seminar will allow students the opportunity to gain valuable knowledge of the service expectations of faculty in higher education settings. The seminar will focus on service opportunities within the university, within the profession and within the community. Participants in the seminar will complete appropriate service activities.
Prerequisite(s): Admittance to the UNO Doctoral program in Biomechanics and Kinesiology, successful completion of 24 hours of doctoral coursework, and approval from advisor. Not open to non-degree graduate students.

BMKI 9851 EXERCISE FOR SPECIAL POPULATIONS (3 credits)
The course will examine the physiological and medical limitations imposed on people with various common chronic diseases/conditions including arthritis, osteoporosis, exercise-induced asthma, obesity, diabetes, hypertension and pregnancy. Special groups such as children and elders will be discussed. Content will emphasize the etiology and guidelines for exercise testing, prescription, and supervision. (Cross-listed with HEKI 8850).
Prerequisite(s): PE 4940/KINS 4940 or PE 8946/KINS 8946

BMKI 9870 MUSCULOSKELETAL SIMULATION (3 credits)
This course covers knowledge and skills needed to generate dynamic models, analyses, and simulations of the human musculoskeletal system for different types of movement. In this course, students build and analyze computer simulations implemented on common software platforms to gain insight into movement biomechanics and control. The materials covered in this course may be of interest to engineers, physical therapists, and biomedical researchers looking to apply their technical skills to solving clinical problems. This course emphasizes the technical skills necessary to conduct and analyze musculoskeletal simulations of movement.
Prerequisite(s): Department Permission.

BMKI 9910 DOCTORAL SEMINAR (1-24 credits)
The major goal of this course is to teach the graduate student how to write manuscripts/grants and be an effective academician with strong ethics. The outcome of this course is for the student to produce a manuscript based on data acquired in the laboratory from the ideas developed in the seminar or submit a grant that will support the research ideas developed in at least one semester. The material covered is intended to equip students with the skills necessary to be successful in their academic careers with emphasis given on writing scientific papers.
Prerequisite(s): Admission into the PhD program. Not open to non-degree graduate students.

BMKI 9911 INDEPENDENT STUDY IN BIOMECHANICS (1-6 credits)
This is a variable credit course designed for graduate students in Biomechanics who would benefit from independent reading assignments and problems. Independent study enables individual students or a small group of students to focus on topics typically not explored in other offerings or to explore topics currently offered in further depth. (Cross-listed with BMCH 8910).
Prerequisite(s): Graduate student in BMCH and approval by Faculty Advisor. Not open to non-degree graduate students.

BMKI 9951 ADVANCED EXERCISE PHYSIOLOGY (3 credits)
A detailed analysis of selected topics including acute and chronic effects of exercise on metabolic, pulmonary, and cardiovascular function; and sports nutrition. Current research findings and methodology will be emphasized. (Cross-listed with KINS 8950).
Prerequisite(s): PE 4940/KINS 4940 or equivalent

BMKI 9960 ADVANCED EXERCISE PHYSIOLOGY II (3 credits)
The focus of this course is a detailed analysis of the mechanisms responsible for acute and chronic responses to exercise at the cellular and molecular level. Current and historical research will be emphasized.
Prerequisite(s): PE 8950/KINS 8950 or BMKI 9951/PE 9951/KINS 9951. Not open to non-degree graduate students.

BMKI 9971 TOPICS IN SPORTS MEDICINE (3 credits)
This course is designed to help students synthesize and apply their knowledge of athletic training and sports medicine to current topics, unique populations, and other areas of exercise, sports medicine and health care. (Cross-listed with KINS 8970).

BMKI 9990 DISSERTATION (1-15 credits)
The course provides doctoral candidates in Biomechanics & Kinesiology with a process to complete a dissertation research plan. The course learning activities will focus on the completion of a candidate's dissertation. The course is designed to allow advanced doctoral candidates to demonstrate technical mastery of the discipline and to advance knowledge by completing an investigation.
Prerequisite(s): Admittance to UNO Doctoral Program in Biomechanics & Kinesiology, successful completion of doctoral coursework & comprehensive exams, dissertation supervisory committee chair approval & advancement to candidacy. Not open to non-degree graduate students.